



AVIATION RULEMAKING ADVISORY COMMITTEE (ARAC) MEETING

March 16, 2023 ***1:00 PM – 4:00 PM

- Welcome and Introductions
 - Federal Advisory Committee Act (FACA) Statement
 - Ratification of Minutes
 - Status Updates and Recommendation Reports
 - ARAC
 - Airman Certification System Working Group – Mr. David Oord
 - Training Standardization Working Group – Mr. Brian Koester
 - ❖ Standardized Curriculum Recommendation Report
 - Part 65.101 Repairman Certificate Portability Working Group – Mr. Ric Peri
 - Transport Airplane and Engine (TAE) Subcommittee – Mr. Keith Morgan
 - Flight Test Harmonization Working Group – Mr. Brian P. Lee
 - ❖ Phase 4/Topic 21 – Narrow Runway Operations (Present Recommendation Report to ARAC: 06/2023)
 - ❖ Phase 4/Topic 16 – Failure Assessment Methodology & Evaluation (FAME) (HQRM) (Present Recommendation Report to ARAC: 06/2023)
 - ❖ Phase 4/Topic 33 – Landing Distance on Dry Runway (Present Recommendation Report to ARAC: 3/2023)
 - Transport Airplane Metallic and Composite Structures Working Group – Mr. Doug Jury
 - ❖ Repeat Inspections and Crack Interaction Recommendation Report
 - Ice Crystals Icing Working Group (Present Recommendation Report to ARAC: 2024) – Ms. Melissa Bravin and Mr. Allan van de Wall
 - Any Other Business
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- FAA Update on Regulatory Activities
- Fiscal Year 2023 Meeting Dates
 - Thursday, June 15, 2023
 - Thursday, September 21, 2023

ARAC agendas, meeting minutes, and reports are available on the FAA's committee website at https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/committee/browse/committeeID/1

**AVIATION RULEMAKING ADVISORY COMMITTEE
DRAFT RECORD OF MEETING**

MEETING DATE: December 8, 2022

MEETING TIME: 9:00 a.m.- 12:00 p.m. PT

LOCATION: The Aviation Rulemaking Advisory Committee (ARAC) held a hybrid meeting at NASA AMES Conference Center Building 3, 500 Severyns Avenue, Moffett Field, CA 94035, and virtually on Microsoft Teams.

PUBLIC ANNOUNCEMENT: The Federal Aviation Administration (FAA) provided notice to the public of this ARAC meeting in a *Federal Register* notice published on November 22, 2022 (87 FR 71391).

ATTENDEES: **Committee Members**

David Oord (In-person)	Wisk <i>ARAC Chair</i>
Justin Barkowski	American Association of Airport Executives (AAAE)
Michelle Betcher	Airline Dispatchers Federation (ADF)
Tom Charpentier	Experimental Aircraft Association (EAA)
Ambrose Clay	National Organization to Insure a Sound Controlled Environment (N.O.I.S.E.)
Chris Cooper	Aircraft Owners and Pilots Association (AOPA)
Walter Desrosier	General Aviation Manufacturers Association (GAMA)
Gail Dunham	National Air Disaster Alliance Foundation (NADAF)
Stéphane Flori	Aerospace & Defense Industries Association of Europe (ASD)
Daniel Friedenzohn	Embry-Riddle Aeronautical University
Paul Hudson	FlyersRights.org
Sarah MacLeod	Aeronautical Repair Station Association (ARSA) <i>Co-Chair, Part 145 Working Group</i>
Chris Martino	Helicopter Association International (HAI)
Keith Morgan	Pratt & Whitney

	<i>Chair, Transport Aircraft and Engine (TAE) Subcommittee</i>
Ric Peri	Aircraft Electronics Association (AEA) <i>Chair, Part 65.101 Repairman Certificate Portability Working Group</i>
Larry Rooney	Coalition of Airline Pilots Association (CAPA)
Yvette A. Rose	Cargo Airline Association (CAA)
Chris Witkowski	Association of Flight Attendants (AFA)
Attendees	
Rodrigo Ribeiro Alencar	National Civil Aviation Authority - Brazil
Ellen Birmingham	United Airlines
Tanya Boisseranc	Boeing
Dave Carew	Sikorsky Aircraft Corporation
Antonio Chiesa	Transport Canada Civil Aviation
Christine Clark	NASA
Matthew Davis	UPS Flight Forward Inc.
Maryann DeMarco	CAPA
Pedro Di Donato	Brazilian National Civil Aviation Agency
Mary Fox	Boeing Company
Loren Haworth	San Jose State University Research Foundation Inc.
Doug Jury	<i>Delta Airlines Chair, Transport Aircraft Metallic and Composite Structures Working Group</i>
Brian Koester	National Business Aviation Association (NBAA)
Mark Larsen (In-person)	NBAA
Jana Lozano	Delta Airlines
Justin Madden	Airlines for America
Chris Moore	International Brotherhood of Teamsters
FAA	
Angela Anderson (In-person)	Office of Rulemaking (ARM)
Chris Bailey	ARM
Nicole Bartolucci	Office of Aviation Policy & Plans (APO)

Thuy Cooper (In-person)	ARM
Jim Crotty (In-person)	ARM
Bryan Davis	Flight Standards Service (AFS)
Michelle Ferritto (In-person)	ARM
Carole Gaelick	APO
Svyatoslav Guznov	Aircraft Certification Service (AIR)
Johann Hadian	ARM
Megan Harding	ARM
James King	AFS
Nellie Lew	APO
Kawehi Lum	AFS
Daron Malmborg	AFS
Suzanne Masterson	AIR
Abbie Otis	AFS
Lakisha Pearson (In-person)	ARM
Alberto Ramon	APO
Robert Reckert	AFS
Brandon Roberts (In-person)	ARM, <i>Designated Federal Officer</i>
Monico Robles	AFS
James Sapoznik	AIR
Puja Sardana	FAA Contractor
Walter Sippel	AIR
Alan Strom	AIR
Joshua Tarkington	AFS
Lisa Thomas	AIR
Kristin Tullius	FAA Contractor
Andrew Whitaker	APO

Welcome and Introduction

Mr. Brandon Roberts, Designated Federal Officer (DFO), called the meeting to order at 9:04 am PT. He reminded everyone that the meeting was being recorded, and he reviewed logistics for the hybrid meeting.

Mr. Roberts read the required FACA statement (Title 5, United States Code (5 U.S.C.); Appendix 2 (2007)). He stated that members of the public may address ARAC with permission of the Chair, Mr. David Oord.

Mr. Oord stated that virtual attendance would be recorded using Microsoft Teams and that three recommendation reports would be reviewed at the meeting.

Ratification of Minutes

Mr. Oord asked for a motion to accept the September 8, 2022,¹ ARAC meeting minutes. Ms. Yvette Rose motioned to accept the minutes, and Mr. Larry Rooney seconded the motion.

Mr. Paul Hudson asked to confirm the FOIA language about releasing records, and Mr. Roberts noted that the attorney who presented the FOIA presentation is not present at the meeting to speak on the topic. Mr. Oord agreed to keep the language as is.

All ARAC members voted in favor of ratifying the minutes.

Status Reports/ Recommendation Reports

A copy of the December 8, 2022, meeting packet, which includes working group presentations, can be found at:

https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/document/information/documentID/5745

Airman Certification Systems Working Group (ACSWG)

Mr. Oord, ACSWG Chair, provided the working group's status report. The update included an overview of membership, a summary of tasking, a review of the schedule, the status of tasking, and areas for ARAC consideration.

Mr. Oord stated that the tasking, status, and membership have remained the same. He noted that the Call-to-Action report was approved by ARAC at the June 2022 meeting and that the group is in a holding pattern due to limitations and hurdles related to incorporation by reference (IBR) and ex parté.

¹ The September 8, 2022, meeting minutes can be found at:
https://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/document/information/documentID/5643.

Mr. Oord reviewed the meeting schedule and noted that the working group has checked in with each other and confirmed that the status of tasking is on hold. Mr. Oord said that the group is awaiting feedback on previously submitted recommendations from FAA before they can continue any work.

Mr. Oord suggested that any guidance from the FAA would be appreciated to allow them to continue their work. Mr. Ric Peri asked the agency how these standards are maintained and how revisions to these criteria will be addressed moving forward. Mr. Roberts commented that the IBR process has not been fast nor easy, and he hopes the agency will provide an update at the ACS working group meeting on December 12, 2022.

Members discussed IBR and thanked the group for the critical work. Many encouraged the FAA to move forward with the recommended standards and offered their support to write letters or take any other action to support the working group. Mr. Oord noted that he would explore options as necessary after the December 12, 2022, meeting.

Part 145 Working Group

Ms. MacLeod provided the Part 145 Working Group update, which included a review of membership (noting the diverse representation), a summary of tasking, the schedule, the status of tasking, and areas for ARAC consideration. Ms. MacLeod noted that the tasking is complete and that the final report was submitted to ARAC for discussion at today's meeting.

Ms. MacLeod noted that a comprehensive review of internal and external guidance material, in relation to the current laws and regulations, that pertain to certifying and overseeing all part 145 repair stations was provided in a preliminary report approved by ARAC in December 2020. She further noted that a supplemental special report with an example of the Acceptable Means of Compliance (AMC) that ensures compliance with the task was submitted and accepted, and that the final report with recommendations was completed November 8, 2022, for ARAC's consideration.

Ms. MacLeod described the following five recommendations in the final report:

- 1) Adopt a single AMC document containing the compliance information needed by applicants and certificate holders to apply for and maintain, and for the agency's personnel to certificate and surveil part 145 repair stations.
- 2) Develop regulation-based training that provides the history, intent, and expected results for the certification and oversight of repair stations using the chronological information on the control of civil aviation maintenance.
- 3) Amend the safety assurance system data collection tool to clearly differentiate between compliance elements and risk indicators.
- 4) Update the application process to reflect the current requirements of part 145.
- 5) Review the operations specifications' paragraphs and remove any that are not safety limitations.

Mr. Peri emphasized the importance of the recommendations.

Mr. Oord asked for a motion to accept the Part 145 Working Group's report. Mr. Keith Morgan motioned to accept, and Mr. Chris Martino seconded the motion.

Mr. Chris Witkowski asked about the estimated timeline of completion for the AMC recommendations and if a new tasking would be required. Ms. MacLeod confirmed that the group agreed to continue the work with or without a new tasking. Mr. Peri agreed, noting that the group completed the tasking without that information but that it would be a disservice to the work not to include it. Mr. Oord noted that he supported submitting the final recommendation report now and submitting any supplemental work when it is complete. Mr. Witkowski stated that he would abstain from voting since the AMC language isn't finalized. Ms. MacLeod noted that a sample of potential language has been included.

ARAC voted to accept the report with one abstention, and Mr. Oord confirmed he would submit the report to the FAA.

Training Standardization Working Group (TSWG)

Mr. Brian Koester provided the TSWG's status report. The update included an overview of membership, a summary of tasking, a review of the schedule, the status of tasking, and areas for ARAC consideration, including their recommendation to update the master schedule.

Mr. Koester noted that the group has met all their intended deadlines and completed their first two tasks. He stated that the group meets quarterly and may submit ad hoc recommendation reports, including continuous improvements, to standardized curricula, via ARAC to the FAA for review and consideration at any time. He described the following remaining tasks:

- Develop and recommend part 135 standardized curricula for each aircraft or series of aircraft, including the maneuvers, procedures, and functions to be performed during training and checking;
- Recommend continuous improvements to each part 135 standardized curriculum for a specific aircraft or series of aircraft; and
- Develop reports containing recommendations for standardized curricula and results of the tasks listed here. The group should review any relevant materials to assist in achieving their objective, including FAA Advisory Circular 142-1,2 Standardized Curricula Delivered by Part 142 Training Centers.

Mr. Koester summarized the following areas for ARAC consideration:

- to note that information from Bell was not included due to turnover but will be included in the next revision

- to note that action teams have been established to cover current topics in the master schedule, and the group is recommending building the following two new action teams -
 - CL-30 Challenger 300/350
 - BE-300 King Air 300

Mr. Koester described the following recommendation from the group: *to update the master schedule for aircraft-specific standardized curriculum development as submitted, determined through research and data analysis, and the priority in which each aircraft or series of aircraft curriculum will be developed.*

Mr. Oord asked how membership and leadership is determined for the action teams. Mr. Koester noted that membership is based initially on the tasking, and leadership is determined by the expertise of representation needed, leadership experience, and availability (people's desire to volunteer for the role).

Mr. Oord asked for a motion to accept the recommendation to update the master schedule from the 2019 version. Ms. MacLeod motioned to accept the report, and Mr. Morgan seconded the motion. All ARAC members voted in favor of accepting the recommendation.

Part 65.101 Repairman Certificate Portability Working Group

Mr. Peri provided the Part 65.101 Repairman Certificate Portability Working Group status report update. He noted that a replacement for Mr. Justin Madden had not yet been filled and the group may need more air carrier representation in its membership. Mr. Peri stated that the group meets monthly.

Mr. Peri provided the status for the group's task, which is to provide advice and recommendations to ARAC on the most effective ways to allow a repairman certificate issued under § 65.101 to be more portable from one employing certificate holder to another. He noted that the working group will review all relevant materials to assist in achieving their objective. He described the group's progress and shared data they have gathered so far, which will be the basis for some of their recommendations. Mr. Peri focused on the need to edit § 65.15 (Duration of Certificates) and regulatory conflict between parts 65 and 145.

Mr. Peri further described the need for a repairman to be both qualified and certificated.

Transport Airplane and Engine (TAE) Subcommittee

Mr. Keith Morgan, the TAE Subcommittee Chair, provided the TAE Subcommittee status report update. He stated that there are currently four active TAE Subcommittee working groups: Flight Test Harmonization (FTH), Transport Airplane Metallic and

Composite Structure (TAMCS), Ice Crystal Icing (ICI), and Avionic Systems Harmonization (ASH).

Mr. Morgan reviewed the schedule of regular quarterly meetings and the following schedule of deliverables:

- March 2023
 - ICIWG Interim report
 - FTHWG Dry Runway
 - TAMCSWG Crack Interaction

- June 2023
 - FTHWG Narrow Runway

Mr. Morgan provided the following status updates for each subcommittee.

Flight Test Harmonization Working Group (FTHWG)

Mr. Morgan stated that the group has been working on phase 4 of the tasking. He described a breakdown of the tasks and how the work is being delegated. Mr. Morgan reviewed the schedule, described the tasking, and stated that the status is on track. He noted that the group's work should be closed out around mid-2024, and they do not need anything from ARAC at this time.

Transport Aircraft Metallic and Composite Structures Working Group (TAMCSWG)

Mr. Morgan provided an overview of the TAMCSWG status report. He reviewed membership (noting that Mr. Jury is the Chair of the working group), tasking, and schedule. Mr. Morgan summarized the original tasking and described the extended topics that were added.

Ice Crystals Icing Working Group (ICIWG)

Mr. Morgan reviewed the ICIWG membership and the summary and status of tasking.

Mr. Morgan mentioned that upcoming flight campaigns would provide valuable data on air pollution for the working group. He noted that the group has regular meetings and is making good progress. Mr. Morgan reviewed the schedule, which shows the interim report tentatively completed by March 2023 and a final report tentatively being submitted by December 2024. He stated that there are no areas for ARAC consideration at this time.

Avionics System Harmonization Working Group (ASHWG)

Mr. Morgan asked Mr. Loran Haworth to present the ASHWG recommendation report. Mr. Haworth described the following recommendations:

- Task Question 1 - Are the existing industry standards or guidance material sufficient?
 - No, existing industry standards/guidance material are not sufficient.
 - Existing industry standards, regulations and associated advisory material including §25.1309/Advisory Circular (AC) 25.1309-1A (System design and analysis), § 25.1302/AC 25.1302-1 (Equipment used by the flight crew) are helpful in a system design, but there is no current standard nor guidance material that specifically requires a ground spoilers alert.
 - ASHWG proposes a new rule §25.704 “Landing Configuration Alerting System,” along with a proposed new AC 25.704.

- Task Question 2 - Are the existing alerting standards in 14 CFR part 25 sufficient, or do you recommend changes to the existing alerting requirements?
 - The ASHWG does not propose any changes to existing alerting standards.
 - The existing §25.1322 standard along with AC 25.1322-1 provides adequate requirements and guidance regarding development, evaluation, and determination of compliance of any specific alert, and does not need to be modified.

- Task Question 3 - Are there any additional considerations that the FAA should take into account regarding avoidance of landing without ground spoilers armed?
 - No. Regarding ground spoilers, the proposed rule and AC will be sufficient.
 - However, the ASHWG strongly recommends a follow-on tasking to update the proposed § 25.704 and proposed AC 25.704 to truly capture the broad topic of landing configuration alerting which would help mitigate the effect of a runway overrun AC 91-79A CHG 2, “Mitigating the Risks of a Runway Overrun Upon Landing” points out that there are other identified hazards associated with runway overruns.
 - The ASHWG strongly recommends that EASA CS 25.705, Runway Overrun Awareness and Avoidance System (ROAAS), and Acceptable Means of Compliance (AMC)25.705 be fully adopted by/harmonized with the FAA

Mr. Morgan reviewed the list of members, other considerations, and the following areas are for ARAC consideration:

- Review the submitted report;
- Provide concurrence or questions to address prior to concurrence; and
- The ASHWG would like to review the draft Landing Configuration Alerting System NPRM prior to publication in the Federal Register.²

² The FAA notes that the agency does not have a current rulemaking related to landing configuration alerting system.

Mr. Oord asked if there was a motion to accept the ASHWG report. Ms. MacLeod motioned to accept the report, and Mr. Walter Desrosier seconded the motion. All ARAC members voted in favor of accepting and forwarding the report to the FAA.

Mr. Roberts noted that FAA may re-task or consult with the working group after the FAA reviews the report.

Other Business and FAA Updates

FAA Personnel Changes

Mr. Roberts announced the following FAA personnel changes.

- Angela McCullough has been named the new Executive Director for the Office of Policy and Planning.
- Todd Steiner, who served as the Director for Economic Analysis in APO-300, has left the FAA and Nellie Lew is acting APO-300. This is the office responsible for performing the cost-benefit analysis on rulemaking projects.
- Jay Merkle, the Executive Director for AUS, retires in December 2022.

Regulatory Updates

Mr. Roberts provided the following regulatory updates since the September 2022 meeting:

- Increase the Duration of Aircraft Registration Direct Final Rule - published November 22, 2022. The comment period closes December 22, 2022, and it will become effective January 23, 2023.
- Medical Standards for Commercial Balloon Operations Final Rule - published November 22, 2022. This rule is effective December 22, 2022, except for the amendments to §§61.3(c)(2)(vi), 61.23(a)(2)(i), 61.23(a)(2)(ii), 61.23(a)(2)(iii), 61.23(b)(3), 61.23(b)(4), 61.23(b)(5), 61.23(d)(1)(iii), and 61.23(d)(2)(i), which are effective May 22, 2023.
- Yaw Maneuver Conditions Final Rule - published November 22, 2022. This rule is effective January 23, 2023.
- Update to Air Carrier Definitions Notice of Proposed Rulemaking (NPRM) - published December 7, 2022. The comment period closes on February 6, 2023.
- Systems Safety Assessment NPRM - published December 8, 2022. The comment period closes on March 8, 2023.

- Airmen Certification Standards (IBR) NPRM will publish on December 12, 2022, with a 30-day comment period.
- The comment period for the G-V curriculum closed on November 9, 2022, and the comment period for Minimum Seat Dimensions closed on November 1, 2022.

Mr. Justin Barkowski asked when the agency expected the Airport SMS final rule to publish, and Mr. Roberts stated that he believes it would publish in December. He noted the rule is with OIRA for review.

Mr. Desrosier asked for clarification on parts associated with the SMS NPRM, and Mr. Roberts noted that the legislative requirement is for part 21.

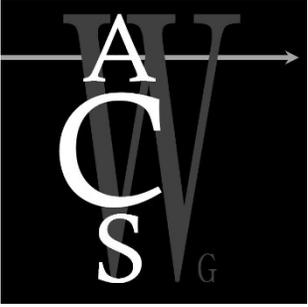
ARAC Update

Mr. Roberts noted that there are no ARAC updates. Ms. Gail Dunham asked if there were any considerations to allow alternates in the future or additional aviation public interest groups. Mr. Roberts responded that he did not believe the DOT Committee Order allows alternates, but he sees value in and appreciates feedback for the future.

Ms. Rose asked if a vice-chair would be appointed, and Mr. Roberts noted that one would be appointed by the time the membership packet is complete.

Adjournment

Mr. Roberts thanked Mr. Oord and NASA for hosting the meeting. Mr. Oord stated that the next meeting will be on March 16, 2023. Ms. Dunham noted a potential schedule conflict with the September 2023 ARAC meeting. Mr. Oord thanked her, and he adjourned the meeting at 11:45 am PT.



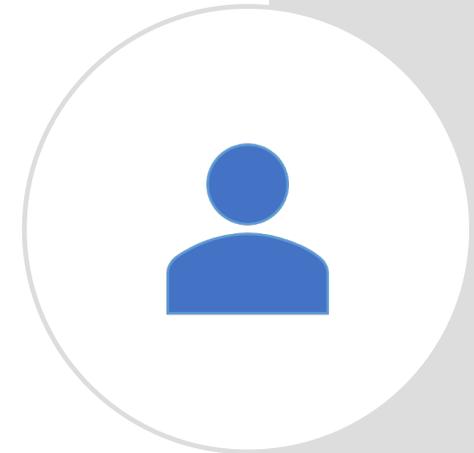
Airman Certification System Working Group Status Report to the Aviation Rulemaking Advisory Committee

David Oord
Working Group Chair

March 16, 2023

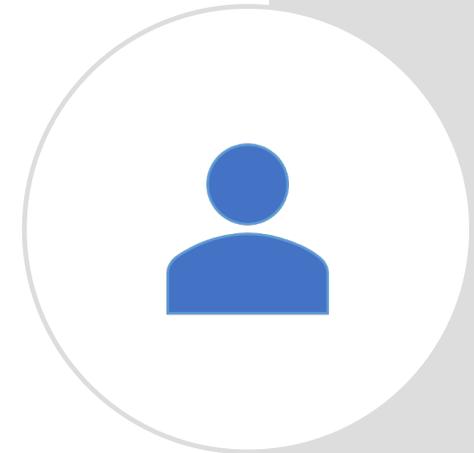
MEMBERS of ACSWG - INDUSTRY

- David Oord, Wisk
- Paul Alp, Jenner & Block
- Cindy Brickner, SSA
- Paul Cairns, ERAU
- Kevin Comstock, ALPA
- Chris Cooper, AOPA
- Mariellen Coupee, Independent
- Eric Crump, Polk State College
- David Dagenais, FSCJ
- Maryanne DeMarco, CAPA
- Rick Durden, Independent
- Megan Eisenstein, NATA
- David Earl, Flight Safety
- Tom Gunnarson, Wisk
- John Hazlet Jr., RACCA
- Jens Hennig, GAMA
- Chuck Horning, ERAU
- David Jones, Avotek
- John King, King Schools
- Janeen Kochan, ARTS Inc.
- Kent Lovelace, UND
- John McGraw, NATA
- John McWhinney, King Schools
- Crystal Maguire, ATEC
- Nick Mayhew, L3
- Jimmy Rollison, Independent
- Mary Schu, Mary Schu Aviation
- Roger Sharp, Independent
- Jackie Spanitz, ASA
- Burt Stevens, CFI Care
- Robert Stewart, Independent
- Tim Tucker, Robinson
- Robert Wright, NBAA
- Donna Wilt, SAFE
- Roger Woods, Leonardo
- Philipp Wynands, Metro Aviation



MEMBERS of ACSWG – FAA SMEs

- Barbara Adams
- Bill Anderson
- Dennis Byrne
- James Ciccone
- Bryan Davis
- Joel Dickinson
- Mike Duffy
- Troy Fields
- Ramona Fillmore
- Adam Giraldes
- Laurin J. Kaasa
- Jeffrey Kerr
- Ricky Krietemeyer
- Karen Lucke
- Mike Millard
- Anne Moore
- Kevin Morgan
- Margaret Morrison
- Richard Orentzel
- Katie Patrick
- Andrew Pierce
- Robert Reckert
- Jason Smith
- Chris Thomas
- Shelly Waddell Smith
- Jeff Spangler
- Robert Terry
- Matt Waldrop
- Stephanie Williams
- Bill Witzig
- Jimmy Wynne
- Christopher Yanni



SUMMARY OF TASKING

- Provide recommendations regarding standards, training guidance, test management, and reference materials for airman certification purposes.
- Continuation of Pilot, Instructor, and Aircraft Mechanic certificates.
- Revisions for Private, Commercial, Remote Pilot certificates and the Instrument Rating.
- Added Sport and Recreational Pilot certificates – airplane.
- Added Private, Commercial, ATP, and Instructor certificates and Instrument Rating in additional aircraft categories–
 - Rotorcraft, powered lift, lighter-than-air, glider, etc.

SCHEDULE

- Interim reports
 - PVT, COM, ATP, Instructor, and AMT certificates and Instrument Rating – no later than June 2018 - complete
- Final recommendation report TBD
 - Unable to complete due to incomplete taskings and restrictions

SCHEDULE

- **2022 Meetings –**
 - February 17 (virtual meeting)
 - September 6, industry check-in call
 - December 13 (virtual meeting)
- **2023 Meetings –**
 - April 18 (virtual meeting)
 - June 13-15 (TBD)
 - September 19-21 (TBD)

STATUS OF TASKING

- Progress on Standards, Guidance, and Test Management on hold
 - Publication of completed ACS documents waiting on Incorporation by Reference (IBR) rulemaking
 - Industry members review of and comments to draft documents that were published in the docket
 - “Industry members and stakeholders who have voluntarily been part of the ARC and ARAC working groups have put significant effort and expense over an 11-year timeframe to develop the various components of the Airman Certification system – including new draft certification standards, associated guidance materials, and testing materials. The draft documents and recommendations were developed over years of work and ultimately submitted to ARAC for broader aviation stakeholder review and approval – subsequently forwarded to the FAA for implementation. Members of the working group were surprised and disappointed to see that several of the documents (Helicopter, Balloon, Powered-Lift, and Authorized Instructor) that were put into the docket associated with this NPRM do not reflect the documents that the working group developed, submitted to, and approved by ARAC for the FAA to implement. So those years of work are not lost, and the documents reflect current training and certification safety needs, we strongly recommend the FAA implement the documents that have been developed and approved under the established ARAC process. Not doing so, will undo years of work and will negatively impact safety.”

Training Standardization Working Group Status Report to the Aviation Rulemaking Advisory Committee



September 8, 2022

MEMBERS of Training Standardization Working Group

Thomas	Benvenuto	Solairus Aviation
Stephen	Bragg	Executive Jet Management
Greg	Brown	Helicopter Association International
Fabiano	Cypel	Embraer
Jon	Dodd	Coalition of Airline Pilots Associations
Steve	Hall	FlightSafety International
Aimee	Hein	CAE, Inc.
Jens	Hennig	General Aviation Manufacturers Association
Brian	Koester*	National Business Aviation Association
Doug	Carr	National Business Aviation Association
Todd	Lisak	Air Line Pilots Association
Steve	Maloney	Sun Air Jets
Allan	Mann	Wheels Up, LLC
John	McGraw	National Air Transportation Association
Brian	Neuhoff	Airbus Helicopters
Janine	Schwahn	Summit Aviation, Inc.
Annmarie	Stasi	Northwell
Daniel	Von Bargaen	Pilot
Mike	Walton	Textron

FAA Partners

Josh Tarkington

Paul Preidecker

Kevin Hancock

James Sapoznik

Kristin Tullius

* Training Standardization Working Group Chair

SUMMARY OF TASKING

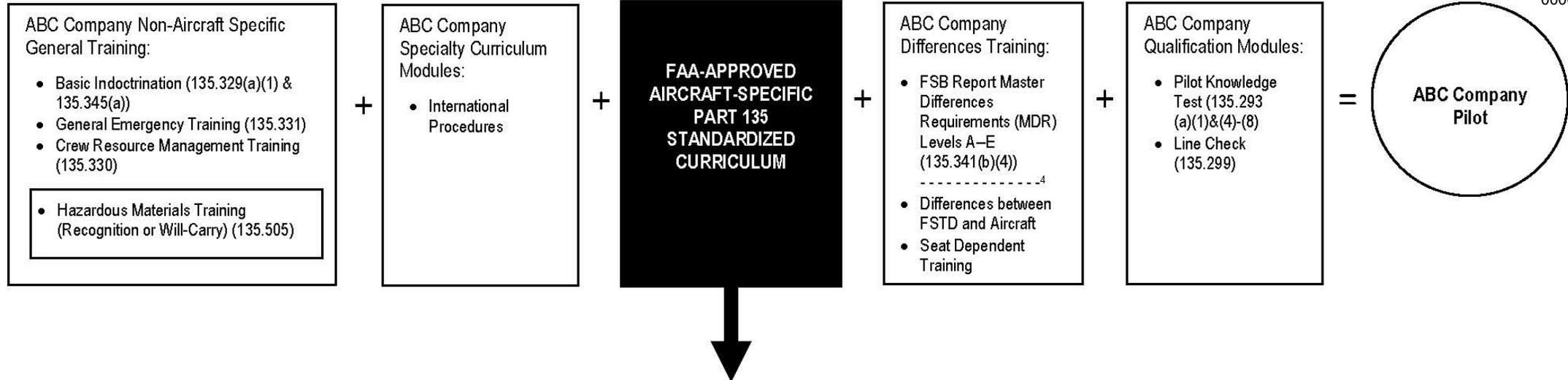
- 1) The Training Standardization Working Group (TSWG) will provide advice and recommendations to the ARAC on the most effective ways to standardize curricula provided by training centers. The group is tasked with the following:
- 2) Recommend a detailed master schedule for the development of part 135 standardized curricula for each aircraft or series of aircraft;
- 3) Develop and recommend a standardized curriculum to qualify training center instructors and evaluators (check pilots) to provide part 135 training, testing, and checking;
- 4) Develop and recommend part 135 standardized curricula for each aircraft or series of aircraft, including the maneuvers, procedures, and functions to be performed during training and checking;
- 5) Recommend continuous improvements to each part 135 standardized curriculum for a specific aircraft or series of aircraft; and
- 6) Develop reports containing recommendations for standardized curricula and results of the tasks listed here. The group should review any relevant materials to assist in achieving their objective, including FAA Advisory Circular 142-1,2 Standardized Curricula Delivered by Part 142 Training Centers.

SCHEDULE

- ✓ June 2021 – Deadline for submitting initial recommendation report including the proposed master schedule for standardized curriculum development to ARAC. The deadline to submit the interim report to the FAA is June 30, 2021.
- ✓ December 2021 – Deadline for submitting the addendum recommendation report, including a standardized curriculum to qualify training center instructors and check pilots to provide part 135 training, testing, and checking to ARAC. The deadline to submit the interim report to the FAA is December 31, 2021.
- The Training Standardization Working Group may submit ad hoc recommendation reports, including continuous improvements, to standardized curricula, via ARAC to the FAA for review and consideration at any time.
- The voting members of the TSWG meet quarterly

STATUS OF TASKING

- Tasking 1 (schedule) and 2 (instructor curriculum) are complete.
 - The FAA is making revisions to the instructor curriculum
- Anticipate recommendations:
- June 2023:
 - Hawker 800
 - Citation Excel
- September 2023:
 - King Air 300
 - Challenger 300



What does the Aircraft-Specific Part 135 Standardized Curriculum *portion* include (what's in the box—which curriculum segments are inside the box)?

Aircraft-Specific Part 135 Standardized Curriculum:

(Note: Aircraft Ground Training & Flight Training Segments under current Definitions.)¹

- Aircraft-Specific Ground Training/Aircraft Systems (135.345(b))
- Flight Training (135.347)²
- SOPs
- Profiles (Maneuvers) (135.327(b)(3))
- Checklists (OEM or developed by SMEs)
- Aircraft-Specific Qualification Modules (Testing/Checking)³
 - Pilot Testing: 135.293(a)(2)&(3)
 - Proficiency Check: 135.293(b)
 - Instrument Proficiency Check: 135.297

- Instructors/Check Airman (Evaluators) qualified by the 142 Training Center in accordance with 135.337 through 135.340 to deliver training, testing & checking under Aircraft-Specific Part 135 Standardized Curriculum.

TSWG Aircraft Type Action Team Tasks:



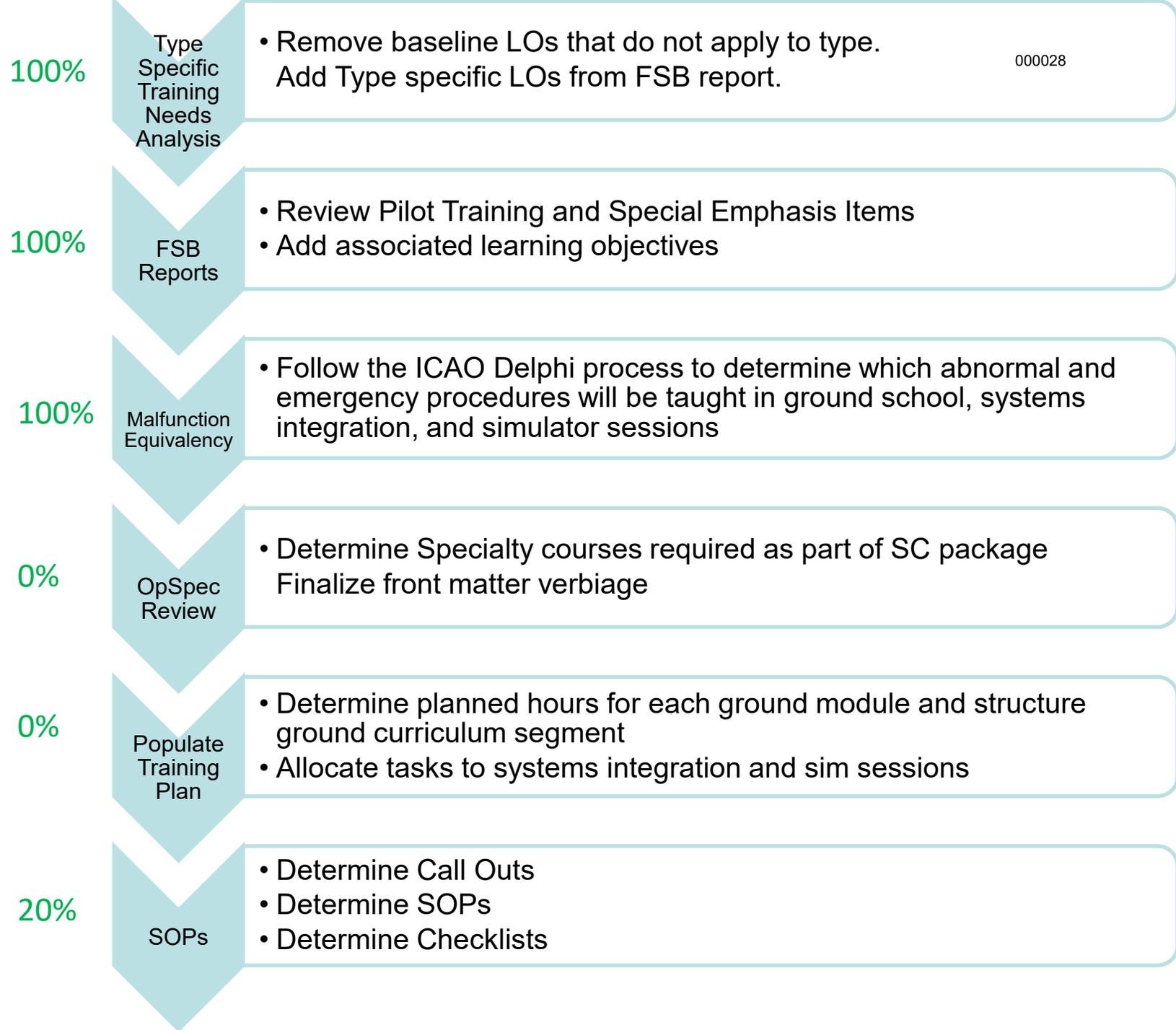
Action Team:	Team Lead	Participants:

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1. Conduct a review and analysis of the assigned tasks and any other related materials or documents.
 - Review TNA
 - Review FSBR
 - Review relevant OpSpecs/MELs
 - Review existing 142 training programs
2. Perform malfunction equivalency exercise.
3. Based on the templates and best practices established by the TSWG Develop and recommend the following curricula, including planned hours, for each aircraft fleet:
 - Initial New Hire,
 - Standard Recurrent,
 - Requalification,
 - Upgrade Recurrent, and
 - Adaptive Recurrent Training.
4. Each Type Specific Action Team will develop the following based on the templates and best practices established by the TSWG, to be used throughout the standardized training program and during normal operations:
 - SOPs
 - Call outs
 - Checklists
5. Draft and submit the recommendation report based on the assigned tasks.
6. Present the recommendation report at the TSWG meeting.
7. Provide continuous improvement for the standardized curriculum based on recommendations from the TSWG.



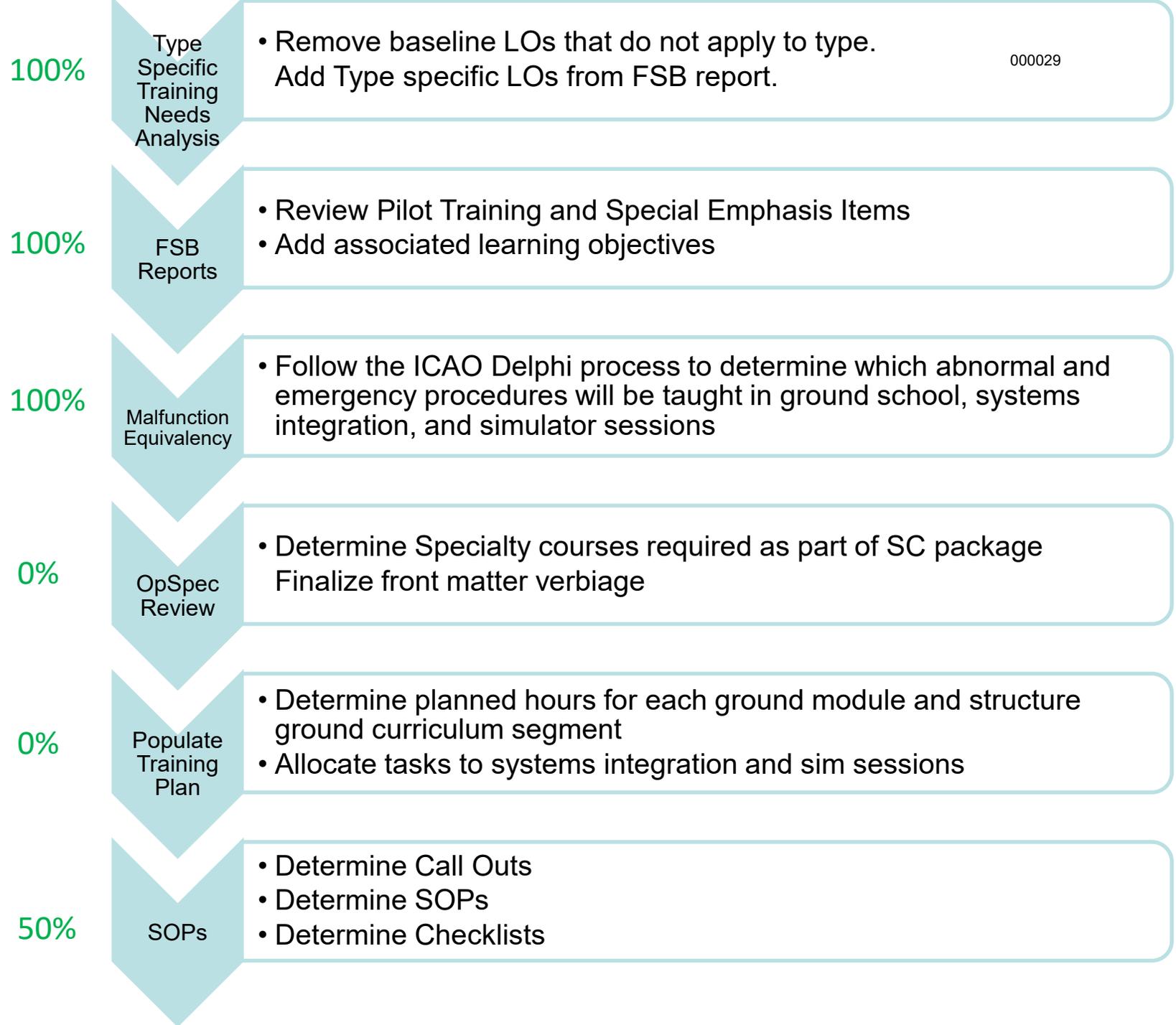
TSWG CE-560 XL Action Team Progress:



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TSWG HS-125 Action Team Progress:



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AREAS of ARAC CONSIDERATION

- New Action Teams:
 - BE-300 King Air Action Team
 - CL-30 Challenger 300 Series Action Team
- G-V Action Team will reconvene to recommend Course 3 (adaptive recurrent)
- News sections in the Dynamic Regulatory System:
 - Aircraft Master Schedule
 - Aircraft-Specific Standardized Curriculum
 - Instructor/Check Pilot Qualification Curriculum

Browse

Expand All Collapse All

- Search for document type/category
- EFB Research Reports
- Electronic Flight Bag (EFB) Checklist
- FAA 90 Day Safety Review
- Handbooks
- Information Guides
- Awards Information Guides (AIG)
- International Publications
- PS Federal Aviation Acts Data
- Regulatory Communications Coordination Board Determinations (RCCB)
- Reporting Systems and Job Aids
- Standardized Curricula
 - Aircraft Master Schedule
 - Aircraft-Specific Standardized Curriculum
 - Instructor/Check Pilot Qualification Curriculum

Aircraft-Specific Standardized Curriculum

Filters

Status Current	Document Number Choose	CFR Part Reference Choose
Title Choose	Office of Primary Responsibility Choose	Aircraft Type Choose
Aircraft Model Choose		

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Showing 1 - 1 of 1 results

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Document Number : Gulfstream GV Master Curriculum

Title: Standardized Curricula Gulfstream GV
Status: Current | **CFR Part Reference:** Part 135 | **Office of Primary Responsibility:** AFS-200 | AFS-280 | **Aircraft Type:** Airplane | **Aircraft Model:** Gulfstream GV | **CFR Subpart/Appendix Reference:** Subpart G - Crewmember Testing Requirements | Subpart H - Training | **CFR Section Reference:** | **AD Reference:** | **Exemption Reference:** | **SFAR Reference:**

RECOMMENDATION(S)

5.1 Recommendation on Adaptive Recurrent Training

The TSWG recommends the FAA develop guidance for industry stakeholders (135 operators and 142 training centers), with accompanying guidance for FAA personnel (e.g., Principal Operations Inspectors (POI) and Training Center Program Managers (TCPM)) allowing 135 operators to incorporate adaptive recurrent training and checking in a part 135 certificate holder's training program/Aircraft-Specific 135 Standardized Curriculum.

RECOMMENDATION(S)

Appendix A – Adaptive Recurrent Training

- Purpose
- Definitions
- Prerequisites
- Ground School
- 135.293(a) Evaluation
- Briefing
- Consecutive Checking
- Initial Observation
- Sim training
- Outcomes
- Change management
- Grading
- Recordkeeping
- Course footprint

RECOMMENDATION(S)

5.2 Recommendation on Training Circling Approaches

The TSWG recommends the FAA revise Order 8900.1 guidance to correct simulator circling approach approval guidance to coincide with the ACS proposed for regulatory Incorporation by Reference (IBR) and support realistic standardized training and checking so that any published Circling Approach may be approved for simulator circling approach training for circle to land on a runway less than 90-degrees offset from the final approach course provided the simulator circling approach used by an applicant during a check or test makes at least 90-degrees of total heading change per ACS.

RECOMMENDATION(S)

5.3 Recommendation on Grouping Approaches

The Training Standardization Working Group recommends the FAA revise FAA Order 8900.1 Volume 3, Chapter 19, Section 6 to facilitate grouping instrument approaches similar to the groupings permitted under part 121.

RECOMMENDATION(S)

5.4 Recommendation on Grading

For all courses contained in the 135 Standardized Curriculum, the Training Standardization Working Group (TSWG) recommends that the standardized four-point grading system recommended in ACT ARC 16-1 Recommendation (g), Data Collection be implemented across all participating training providers and utilized for scoring training events. The four-point grading scale should reference a standardized rubric detailed in Appendix B.

The TSWG further recommends that checking events be recording on a binary scale of “Satisfactory” or “Unsatisfactory” in reference to the current Airline Transport Pilot (ATP) and Type Rating ACS.

In addition to a standardized 4-point grading scale and rubric for training events, and a standardized binary grading scale for checking and testing events, the TSWG recommends standardized curriculum adopt a mechanism by which instructors can record supplemental information on the root cause of pilot performance that falls below or above expected performance at any point during training or checking.

RECOMMENDATION(S)

5.5 Recommendation on the Standardized Curriculum Aircraft/Simulator Training Matrix

The Training Standardization Working Group recommends the FAA revise Standardized Curriculum Aircraft/Simulator Training Matrix to explain the training requirements for a pilot that starts but does not finish a recurrent training program.

RECOMMENDATION(S)

5.6 Recommendation to Improve the G-V Curriculum

The Training Standardization Working Group recommends the FAA revise Standardized Curriculum Aircraft/Simulator Training Matrix with the following technical corrections and improvements to the G-V Standardized Curriculum.

- 1. 3.5 A. Recurrent Training.*
- 2. 8.3 Systems Integration Training.*

RECOMMENDATION(S)

5.7 Recommendation on Part 135 Checking Modules – Airplanes

The Training Standardization Working Group recommends the FAA revise Order 8900.1, Volume 3, Chapter 19, Section 7, Paragraph 3-1283, to align module and task naming conventions, grouping, and requirements with FAA Airline Transport Pilot and Type Rating for Airplane Airman Certification Standards.

DISSENT(S)

- None.

Transport Aircraft and Engines
Subcommittee
Status Report to the
Aviation Rulemaking Advisory Committee

Keith R. Morgan
Subcommittee Chair

16 March 2023

Members of the Transport Aircraft and Engines Subcommittee

Pratt & Whitney

ALPA

A4A

ASD

Airbus

Boeing

GAMA

AIA

NADA/F

Embraer

SRCA

TAE Meeting Schedule

- 2023 Meetings
 - January 24
 - April 25 (planned face-to-face Seattle)
 - July 25
 - October 24 (planned face-to-face Washington DC)

Active Working Groups

- Flight Test Harmonization
- Transport Aircraft Metallic and Composite Structures
- Engine Ice Crystal Icing

Look Ahead Report Submittal Schedule to ARAC

March 2023

- TAMCSWG Crack Interaction

June 2023

- FTHWG Dry Runway
- EICIWG Interim report

September 2023

- FTHWG Narrow Runway

Flight Test Harmonization Working Group
Status Report to the
Transport Aircraft and Engines Subcommittee
of the
Aviation Rulemaking Advisory Committee

Brian P. Lee, Boeing
Laurent Capra, Airbus
Working Group Co-Chairs

24 January, 2023

MEMBERS of Flight Test Harmonization Working Group Phase 4

Authorities	OEM's			Observers
FAA Bob Stoney Joe Prickett Troy Brown (sponsor)	Airbus Philippe Genissel + SME's	Embraer Murilo Ribeiro + SME's	ATR Matthieu Ollivier Jean-Pierre Marre +SME's	JCAB (Japan) Shinsuke Yamauchi
				CAAI (Israel) Yshmael Bettoun
EASA Matthias Schmidt Lorenzo Prieto Saiz	Boeing Brian Lee (Acting) Ryan Westbrook + SME's	Gulfstream Mike Watson +SME's	Airbus Canada Joel Boudreault +SME's	Norwegian Airlines John Lande
				Operations SME David Anvid
Transport Canada Lee Fasken	Bombardier Tony Spinelli +SME's	Textron Kurt Laurie +SME's	DeHavilland Canada Eric Herrmann +SME's	Centre d'Essais en Vol (DGA) Matthieu Buisson
				Operators
ANAC (Brazil) Marcos Carvalho	Dassault Philippe Eichel +SME's			ALPA John Cinnamon Josh Larson

Status of Working Group Activities

- Back in step
 - Quarterly face-to-face meeting (two in Europe, two in North America)
 - Weekly scheduled telecons
- Additional working meetings
 - Dry Runway Stopping is meeting weekly IN ADDITION to finish consensus
 - Subteams of FAME are meeting regularly (IN ADDITION) in support larger group

STATUS OF TASKING

- Tasking for Phase 4 Received in December, 2020
- Planning for the 6 tasks is complete
- Work is under way on 5 topics:
 - FAME (how to deal with failures affecting Handling Qualities)
 - Narrow Runway Certification (at risk: requesting extension (ARAC in September))
 - Dry Runway Braking (Requesting Extension to finish (Now: ARAC in June))
 - Reduced/Derated Thrust Takeoff Procedures (Discussions have begun)
 - Landing Distance for Abnormal Configurations (Discussions have begun)
- ASHWG: (Discussions have begun, plan to deliberate via e-mail)
 - Low Energy Alerting
 - There will be fall-out from the ASHWG Recommendation
 - FTHWG Phase 2 recommended
 - Low Energy Alerting for all phases of flight only for neutral-stability configurations
 - ASHWG recommends
 - Low Energy Alerting only for close-to-ground for all configurations
 - We have put this on our calendar to be worked in Phase 4

Phase 4 FTHWG Topic Technical Status (1 of 3)

- Topic #16 Failure Assessment Methodology & Evaluation (FAME)
 - Now fully engaged (including good interaction with System Safety SME's) making progress
 - 2 sub-teams chartered and meeting regularly
 - Recommend Consistent Flight Envelope for failure evaluations
 - Recommend Consistent Environmental Conditions for failure evaluations
 - Challenge: CATA is working 25.672
 - We have generated specific questions, and have a mechanism to communicate with CATA now in place
 - Another Challenge: NPRM FAA-2022-1544 released 8 December, 2022 is not harmonized with EASA
- Topic # 21 Narrow runway operations
 - Team has converged on the definition a “baseline” runway, and the “regulatory hook” for declaration of runway width
 - We anticipate a protracted discussion with System Safety which will put the topic schedule at risk: recommend an extension to deliver to ARAC September, 2023

Phase 4 FTHWG Topic Technical Status (2 of 3)

- Topic # 33 Landing Distance on Dry Runway (dispatch, not TALPA) Note: This is a harmonization task, not a safety issue.
 - All technical issues to maintain dry runway landing dispatch limitations using harmonized methodology to compute operationally achievable, physics-based landing performance have been agreed.
 - No Dissenting opinions; the Flight team has unanimous consensus
 - There is a sincere effort from the group to produce a document with high quality, providing detailed rationale and good wording for proposed new standard, and anticipating rulemaking difficulties. This makes the task unusually long, but the WG believes it is worth the effort since at the end 3 topics are at stake. (propose ARAC in June, 2023)

However...

- While Operational Factors (from our point of view) have been agreed upon (amongst the Flight Team)
 - The Operations organizations within authorities have not yet engaged
 - Our concurrence will depend on Operations adoption of the recommended factors
- FAA Propulsion Branch (and now, some in TCCA) questioning conditions for thrust reverser credit
 - This concern is common to TALPA, Wet runway stopping, and FAME
- When the Dry Runway Stopping report is finished, we really should re-open Topic 9, Wet Runway Stopping, and Topic 31, TALPA reports and modify to ensure that all are consistent...Consider this (consistency issue) appropriate as a new topic during the next phase.

Phase 4 FTHWG Topic Technical Status (3 of 3)

- Topic # 22 Landing in Abnormal Configurations Kickoff in September in Toulouse
 - On agenda for March meeting in Paris, progressing on schedule
- Topic # 26 Derate Thrust Procedures Kickoff in September
 - On agenda for March meeting in Paris, progressing on schedule

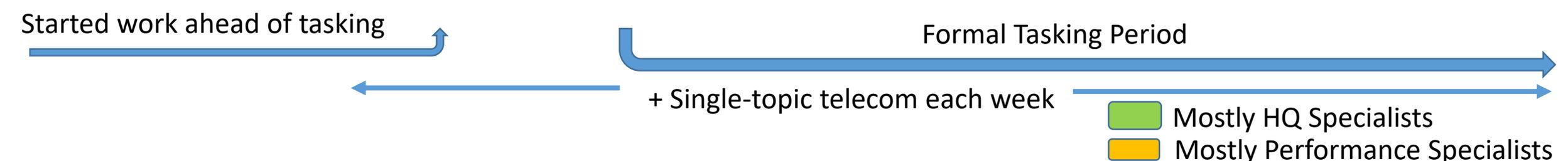
FTHWVG Phase 4 Meeting Plan

Delivery to TAE, Blue Stars

Delivery to ARAC in following quarter, Green Stars

	Dassault Bordeaux	Boeing Seattle Virtual	Easa Cologne Virtual	FAA Seattle Virtual	Airbus Toulouse Virtual	Boeing Seattle Virtual	EASA Cologne Virtual	Embraer Melbourne Virtual	EASA Cologne Virtual	Boeing Seattle Jttawa (TDC)	Airbus Toulouse	FAA Long Beach	Dassault Paris	Textron Wichita	ATR Toulous e	ALPA Co Sprgs	Easa Cologne	Airbus Canada Montreal		
	March 2020 (2-6)	June 2020 (8-12)	Sept. 2020 (14-18)	Dec. 2020 (7-11)	March 2021 (1-5)	June 2021 (7-11)	Sept. 2021 (13-17)	Dec. 2021 (6-10)	March 2022 (7-11)	June 2022 (6-10)	Sept. 2022 (12-16)	Dec. 2022 (5-9)	March 2023 (6-10)	June 2023 (5-9)	Sept. 2023 (18-22)	Dec. 2023 (4-8)	March 2024 (4-8)	June 2024 (3-7)		
Topic #16 HQRM FAME																			★	★
Topic # 32 TALPA (time of arrival performance)											★	★								
Topic # 33 Landing Distance on Dry Runway (dispatch)											★		★	★	★					
Topic # 21 Narrow runway operations													★	★	★					
Topic # 22 Derate thrust procedures																			★	★
Topic # 26 Landing in abnormal configurations																			★	★
ASHWG Low Speed Alert																			★	★

Buffer & Finalization of Phase V preparation



AREAS for ARAC CONSIDERATION

- None at this time
- Happy to be back in cadence

Summary of Highlights for TAE review of proposed *Transport Airplane
Metallic and Composite Structures Working Group – Recommendation
Report to FAA: Crack Interaction*

1/24/2023

Douglas Jury, Delta Air Lines, WG Chair
Walter Sippel, FAA WG representative

Purpose of Presentation

- To provide report status update to TAE
- To assist TAE Subcommittee with the review of the report by providing a high-level summary of –
 - Recommendations, and
 - Items considered as potential recommendations, but that did not receive general agreement

Report status

- Transport Airplane Metallic and Composite Structures Working Group (TAMCSWG) believes it is on schedule to present the Crack Interaction report to the Aviation Rulemaking Advisory Committee (ARAC) in March 2023, pending Transport Airplane & Engine (TAE) Subcommittee acceptance of the report.
- TAMCSWG members agreed, with comments, to the recommendations and basic content contained in the version of the report that was just prior to the one sent to TAE members on 1/16/23.
 - The basic content includes documentation of dissenting positions.
 - Comments limited to correcting grammar and improving readability.

Report status (cont.)

- Report sent on 1/16/23 includes changes that address comments.
 - Report sent to both TAE and TAMCSWG members for concurrent review.
 - WG members to provide comments or concurrence by 1/30.
 - ✓ Expect comments, if any, to be minor.
 - ✓ Anticipate WG members to sign report shortly after 1/30.
- The signed report will be sent to TAE for final acceptance.
 - TAMCSWG will identify any differences between the 1/16/23 and signed version of the report.
 - Anticipate differences to be minimal.

List of Acronyms

AC:	Advisory Circular
AMC:	Acceptable Means of Compliance, also referred to as acceptable method of compliance
CS:	Certification Standards
DSG:	Design Service Goal
DTE:	Damage Tolerance Evaluation
EASA:	European Aviation Safety Agency
GSHWG:	Generalized Structures Harmonization Working Group
LOV:	Limit of Validity
MED:	Multiple Element Damage
MSD:	Multiple Site Damage
PSE:	Principal Structural Element
SDO:	Standards Development Organization
SLP:	Single Load Path
SDC:	Structural Damage Capability
TAMCSWG:	Transport Airplane Metallic and Composite Structures Working Group
WFD:	Widespread Fatigue Damage

TAMCSWG Background – Task Extension

- In 2015, the ARAC established the TAMCSWG, under the TAE Subcommittee to provide advice and recommendations regarding revision of the damage-tolerance and fatigue requirements of Title 14, Code of Federal Regulations (14 CFR), part 25, including subparts C and E of 14 CFR part 26; development of associated advisory material; and estimate associated costs and benefits.
- In 2018, ARAC approved the *Transport Airplane Metallic and Composite Structures Working Group – Recommendation Report*.
 - ARAC also approved a tasking extension to address three additional activities, namely:
 - ✓ Single load path (SLP) structure, which is a topic related to structural damage capability (SDC)
 - ✓ Bonding
 - ✓ Crack interaction
 - The WG has addressed each topic in separate reports to TAE and ARAC: SLP & bonding - both are completed

- FAA noted in the 2018 report that applicants use a variety of ways to comply with requirements in establishing inspections and associated procedures. TAMCSWG recognized this as important and therefore, FAA has requested information from WG on how to address crack interaction when developing inspection programs.
- TAMCSWG did not have time to evaluate how applicants use AC 91-82A for Part 25 airplane certification activities in the 2018 recommendation report, including how applicants address subject of crack interaction.
- AC 91-82A (*Fatigue Management Programs for In-Service Issues*) provides guidance on developing damage tolerance (DT)-based inspections or other procedures of structure for Parts 23 & 25 airplanes to address in-service findings. This AC states that actual cracking scenarios can be complex, involve multiple sites, and at some point, include crack interaction.

TAMCSWG largely focused on the following content for development of recommendations.

- Existing rule evaluated
 - 14 CFR 25.571: *Damage-tolerance and fatigue evaluation of structure.*
 - Including prior recommendations made by TAMCSWG

- Existing guidance evaluation
 - AC 25.571-1D: *Damage Tolerance and Fatigue Evaluation of Structure*
 - AC 91-82A: *Fatigue Management Programs for In-Service Issues*
 - AC 120-104: *Establishing and Implementing Limit of Validity to Prevent Widespread Fatigue Damage*

TAMCSWG also considered comparable EASA rule & guidance in addressing harmonization and for other insight.

Crack Interaction Tasking – Reaching Consensus vs. Agreement

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- TAMCSWG member positions varied on recommendations to address the tasking. Multiple proposals were considered by group, all documented in the report.
- TAMCSWG followed guidance from *Office of Rulemaking Committee Manual* on consensus:
 - Term consensus is applied to report – we have general consensus on report including recommendations. Some dissenting views are documented and addressed – members all support the final report, given recognition of the dissenting positions.
 - Terms agreement/disagreement are applied to detailed proposals we considered.
- Based on existing WG work plan, criterion to determine if proposed recommendation would be presented as recommendation to the FAA:
 - More than two-thirds (i.e., 8+ of 12) voting members agreed with the proposal.
 - If more than two-thirds disagreed with a proposal, then WG identified the item as something the FAA should not pursue (for example, do not revise an AC in a particular way).
- FAA and NAA member positions also captured in report.

Summary of recommendations

The WG is making five recommendations:

1. No rule change; existing text is sufficiently performance-based. Additional changes to guidance would help ensure clarity of the text, with new
2. Revise AC 25.571-1D:
 - A. to add text on considering crack interaction in a DTE, and
 - B. to add a definition for crack interaction
3. Examples of crack interaction should not be included in the revised AC 25.571-1D
4. Examples of methods of compliance should not be included in the revised AC 25.571-1D (too prescriptive)
5. FAA should not task an SDO to further address crack interaction

Report organization

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- Section 1: Introduction & Background (tasking & technical), identification of scope of effort
- Section 2: WG composition, outlines approach to reaching agreement/consensus
- Section 3: Recommendations for rule changes
- Section 4: Recommendations for guidance changes
- Section 5: Cost and benefit discussion for recommendations
- Appendices:
 - A: restatement of key tasking elements
 - B: WG responses to FAA-posed detailed questions related to crack interaction
 - C: Illustration of three examples of crack scenarios where interaction effects are expected
 - D: Example analytical approaches to addressing crack interaction effects
 - E: Tally of WG member voting on guidance recommendation proposals considered
 - F: Discussion of one WG member's evaluation approach of crack interaction
 - G: Example scenarios of crack interaction considered in proposal to supplement crack interaction definition
 - H: Discussion of variety of approaches to address crack interaction in DTE (engineering assumptions)

Rule Change Recommendation (Report Section 3)

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- TAMCSWG reached general agreement¹ on no change to rule (beyond the previously proposed changes in 2018 recommendation report).
- WG did not identify a safety concern. Crack interaction is just one of many considerations in a DTE. Isolating one aspect of an evaluation to demonstrate presence of unsafe condition is difficult. Some WG members noted that further investigation would be necessary to eliminate the potential concern completely.
- WG position is that current rule language is sufficiently performance-based.
- Harmonization with EASA Certification Specifications (CS) rule language was additionally considered with this recommendation¹. Though rule text is not identical, the WG laid out positions which identify similarities. Majority of WG prefers FAA rule text.

¹ Two WG members presented dissenting position on rule language, yet the members agreed to support WG recommendation with their points having been documented and rebuttal to the dissenting positions provided by those representing majority position.

Guidance Change Recommendations (Report Section 4)

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- Existing regulatory guidance materials reviewed to determine which would benefit from changes (Report Section 4.2): ACs 25.571-1D, 91-82A, 120-104.
- Other materials WG reviewed to determine if additional recommendations were needed (Report Sections 4.3 & 4.4).
 - TAMCSWG's 2018 ARAC recommendation report
 - Generalized Structures Harmonization Working Group (GSHWG) 2003 ARAC recommendation report
 - EASA Acceptable Means of Compliance (AMC) 25.571
- WFD evaluation is a subset/special case of DTE – typically for global/repetitive details. WG position is that current crack interaction guidance for WFD evaluations (AC 120-104) is adequate. Therefore, WG focus was on developing updates to AC 25.571-1D, for non WFD-susceptible structure (i.e., local/unique design detail).
- Report identifies four approaches applicants typically use to address crack interaction effects (Section 4.5).

Guidance Change Recommendations (Report Section 4) (Continued)

- WG considered 6 separate proposed updates to AC 25.571-1D, and one additional alternate proposal (Report Section 4.6):
 - Proposal 1: bring awareness to crack interaction¹
 - Proposal 2: define crack interaction¹
 - Proposal 3: provide additional distinction for crack interaction guidance in AC 120-104 for WFD evaluation
 - Proposal 4: clarify the term “at some point” may be related to expected fatigue reliability
 - Proposal 5: provide example means to address crack interaction¹
 - Proposal 6: provide additional guidance on developing inspection intervals¹
 - Proposal 7: task a new SDO to develop means to address crack interaction
- Generally, WG was split on the extent of detail to be presented in the regulatory guidance (typically split between OEM and operator members) – Appendix E contains the WG member votes for each proposal.
- For all proposals, both WG member positions in support and in opposition are presented in the following several slides.

¹ These proposals also include alternative proposals on the same topic evaluated by WG.

Guidance Change Recommendations (Report Section 4) (Continued)

- Proposal 1 (Report Section 4.6.1): Identify need for crack interaction consideration.

Update AC 25.571-1D, Paragraph 6.d (extent of damage) to add similar language from 91-82A stating “cracking scenarios can be complex, involve multiple sites, and at some point, include crack interaction.”

- This mostly mimics current language in AC 91-82A.
- Supported by all WG members as a minimum recommendation. However, some members preferred more extensive updates but were not opposed to this as minimum update.
- WG generally preferred this to adding a reference in 25.571-1D to 91-82A (alternate proposal 4.6.1.2).
- Therefore, proposal is recommended to FAA.

Guidance Change Recommendations (Report Section 4) (Continued)

- Proposal 2 (Report Section 4.6.2): Define crack interaction

Update AC 25.571-1D, Appendix 1 (References and Definitions), Paragraph 2 to introduce a new definition as follows:

“Crack interaction - The effect on crack growth rate due to the simultaneous presence of more than one crack.”

- Supported by all WG members as a minimum recommendation. Some members preferred an alternative option to include examples of cracking scenarios which may require crack interaction considerations (reference 4.6.2.2 & Appendix G) but were not opposed to the WG proceeding with this as recommendation.
- Therefore, proposal is recommended to FAA. The alternate proposal 4.6.2.2 (with illustrative examples) was mostly opposed so recommendation is to FAA to not publish such information in AC.

Guidance Change Recommendations (Report Section 4) (Continued)

- Proposal 3 (Report Section 4.6.3): Provide additional distinction between local design features/details and WFD

Update FAA AC 25.571-1D by adding the following statement to follow the sentence added in Proposal 1:

“Crack interaction has a significant influence in the behavior of WFD (MSD and MED) as discussed in AC 120-104. However, crack interaction can also affect the behavior of cracking at unique design features or details¹”.

¹ Current AC 25.571-1D, Appendix 3, Steps 4 and 6 are available to assist the applicant to determine if their structure being evaluated is WFD susceptible or is a local, unique design detail.

- The WG was unable to reach agreement on recommending this proposed change. More than half of the WG support this change (all four operator members and three OEM members) and the remaining five OEM members oppose this change.
- Therefore, proposal is not recommended to FAA.

Guidance Change Recommendations (Report Section 4) (Continued)

- Proposal 4 (Report Section 4.6.4): Clarify when crack interaction should be considered.

Update FAA AC 25.571-1D by defining (or rephrasing altogether) the term “at some point” (reference Proposal 1) to state that crack interaction should be considered in the DTE when the fatigue reliability¹ within the LOV/DSG has fallen to a level where multiple cracks are expected in the unique design detail, which can be established by fatigue/durability analysis, or established by test or service findings, or both.

¹ As proposed by WG in 2020 SDC SLP report: The ability of the structure to perform its function without failure due to fatigue throughout the operational life of the airplane.

- The WG was unable to reach agreement on proposing this change. Half (six) of the WG supported this change (all four operator members and two OEM members) and the remaining six OEM members opposed this change.
- FAA suggested alternative text to avoid explicit reference to reliability, which WG addressed.
- Therefore, proposal is not recommended to FAA.

Guidance Change Recommendations (Report Section 4) (Continued)

- Proposal 5 (Report Section 4.6.5): Provide example methods to address crack interaction.

Update AC 25.571-1D to include a general description of current industry practice for establishing inspection intervals and addressing crack interaction (reference the four separate items listed in Section 4.5).

- Only the four operator representative members in the WG supported this proposal. All eight OEM representative members opposed this proposal. Both supporting and opposing positions to this proposal are provided in report. Though operator members prefer recommending this particular proposal, they are not opposed to supporting the overall recommendation report submission to TAE & ARAC.
- This proposal also included an alternative with even more detail to provide in AC (reference 4.6.5.2 & Appendix H). This received no difference in support/objection.
- Therefore, recommended the FAA not pursue this as an update to AC 25.571-1D.

Guidance Change Recommendations (Report Section 4) (Continued)

- Proposal 6 (Report Section 4.6.6): Provide guidance on developing inspection intervals.
 - 4.6.6.1: Update AC 25.571-1D to add a new sub-section under Paragraph 6 (Damage-Tolerance Evaluation) for subject of inspection intervals using text from GSHWG in 2003 recommendation report.
 - 4.6.6.2 (Alternative to 4.6.6.1): Update 25.571-1D add some details of this history to the Background section of AC 25.571-1X to point readers to existing guidance in AC 91-82A.
 - A simple majority of the WG members agreed that AC 25.571-1D should be updated to address inspection intervals (six or seven members supported vs. four or five opposed – depending on which option: 4.6.6.1 vs 4.6.6.2). This proposal did not reach the WG agreed standard of 2/3 member support to adopt a recommendation.
 - Therefore, proposal is not recommended to FAA.

Guidance Change Recommendations (Report Section 4) (Continued)

- Proposal 7 (Report Section 4.6.7): Promote a new SDO to develop a means of compliance.

A third-party Standards Development Organization (SDO) may be engaged to determine optional means of compliance for applicants to address effects of crack interaction, using, but not limited to the recommendations to AC 25.571-1D contained in the report.

- Majority (eight voting members) of the WG members opposed this notional proposal, recognizing additional work would be required to better define the tasking as noted.
- Therefore, proposal is the FAA not pursue this as an update to AC 25.571-1D.

Cost and Benefit Analysis (Report Section 5)

WG does not recommend any rule change.

- Though WG is recommending changes to AC, AC provides one means of compliance (but not the only one); an applicant will need to decide how it wants to show compliance.
- It is possible that through the guidance change updates the WG is recommending, some applicants and regulators may become newly aware of this expectation of what may be part of an “extent of damage” consideration. Clarification to guidance, even minor, is considered to provide incremental benefit to industry.
- Therefore, WG position is that the recommendations would not introduce any new or appreciable costs.

Additional discussion items:

- Request for revision to 2018 recommendation report to provide URL hyperlinks to associated reports available on FAA's website repository for ARAC Reports. Such reports include AAWG's reports on SDC, Rotorburst, the TAMCSWG's reports on SDC-SLP structure, structural bonding, and crack interaction (when completed), and other various appendices/links to past reports, etc.
- This would be a minor revision (no change to technical content – just adding URL links to other work related to TAMCSWG, including these extended tasking reports) and need not require full WG participation. Expectation is that TAMCSWG Chair would simply prepare the revision, with FAA sponsor review, and submission to TAE/ARAC for acceptance.

Ice Crystal Icing Working Group Status Report Transport Aircraft and Engines Subcommittee

Melissa Bravin

Allan van de Wall

Working Group Co-Chairs

11 January 2023

ICI Working Group Membership

Member Name	Organization	Role
Philip Haberlen	(FAA-ANE Standards) <u>FAA Representative</u>	FAA Representative
Melissa Bravin	Boeing Commercial Airplanes	WG Co-Chair – Airplane – P
Allan van de Wall	GE Aviation	WG Co-Chair – Engine – P
Aaron Cusher	Collins	Other – P
Adam Malone	Boeing	Consultant
Alberto Ramon	FAA	Non-voting role
Ashlie Flegel	NASA	Consultant
Bob Hettman	FAA	Non-voting role
Bryan Lesko	Air Line Pilots Association	Other – P
Daijiro Kawakami	JCAB	Non-voting role
Dan Fuleki	National Research Council Canada	Consultant
David Dischinger	Honeywell	Engine – P
David Johns	TCCA-probes	Non-voting role
Doug Bryant	FAA	Non-voting role
Eric Duvivier	EASA	Non-voting role
Eric Fleurent-Wilson	TCCA-engines	Non-voting role
Fausto Enokibara	ANAC	Non-voting role
Jeanne Mason	FAA	Consultant
Jim Loebig	Rolls-Royce	Engine – P

Member Name	Organization	Role
John Fisher	FAA	Non-voting role
Jon Saint-Jacques	A4A/Atlas Air	Other – P
Josh Larson	Air Line Pilots Association	Other - P
Julien Delanoy	EASA	Non-voting role
Jun Izumi	JCAB	Non-voting role
Keith Morgan	Pratt & Whitney	ARAC Representative
Keith Wegehaupt	Honeywell	Engine – P
Mauricio Caio Rosin	TCCA	Non-voting role
Philip Chow	FAA	Consultant
Pierre-Emmanuel Arnaud	Airbus	Airplane – P
Rajeev Atluri	AeroSonic	Other - P
Roberto Marrano	Pratt & Whitney Canada	Engine – P
Roxanne Bochar	Pratt & Whitney	Engine – P
Shengfang Liao	Pratt & Whitney East Hartford	Engine – P
Shoichi Yamasaki	JCAB	Non-voting role
Takuya Mikami	JCAB	Non-voting role
Terry Tritz	Boeing	Consultant
Tom Dwier	Textron Aviation	Airplane – P
Tom Ratvasky	NASA	Consultant
Walter Strapp	Met Analytics Inc.	Consultant

Tasking Summary

- The ICIWG will provide advice and recommendations to the ARAC through the TAE Subcommittee on Appendix D to Part 33, and harmonization of §33.68 *Induction System Icing* requirements as follows:
 1. Evaluate recent ICI environment data obtained from both government and industry to determine whether flight testing data supports the existing Appendix D envelope.
 2. Evaluate the results carried out in Task 1 and recommend changes to the existing Appendix D envelope, as required. Examine how compliance with §33.68(e) and §25.1093(b)(1) can be shown to demonstrate that at the airplane level, engine effects that could prevent the continued safe flight and landing of the airplane during encounters in ice crystal icing conditions would be extremely improbable (10^{-9}). If that cannot be shown, recommend changes to the text of §33.68 or §25.1093 (or a combination of both) that would provide the level of safety described by §25.1309(b)(1).
 3. Compare available service data on air data probes from both government and industry probes on Appendix D, including any changes proposed in Task 2. Determine whether engine or aircraft data probe responses warrant the use of a different environmental envelope from those proposed in Task 2, or to the existing Appendix D envelope.
 4. Evaluate the results from Task 3 and recommend ICI boundaries relevant to aircraft and engine air data probes. If the working group proposes a different envelope for aircraft and engine air data probes, recommend if these should be included in the existing Appendix D, or create a new appendix to Part 33.
 5. Identify non-harmonized FAA or EASA ICI regulations or guidance. If the working group finds significant differences that impact safety, propose changes to increase harmonization that may also include icing environments other than Appendix D as a secondary objective.
 6. Recommend changes to the Advisory Circular AC20-147a, *Turbojet, Turboprop, Turboshaft and Turbofan Engine Induction System Icing and Ice Ingestion*, based on Task 1 through 5 results.
 7. Assist the FAA in determining the initial qualitative and quantitative costs, and benefits that may result from the working group's recommendations.
 8. Develop a recommendations report containing the results of tasks 1 through 6. The report should document both majority and dissenting positions on the findings, the rationale for each position, and reasons for disagreement.

2023 Schedule

- 31 January – Tentative due date: Interim report submitted to FAA
- 31 January – 02 February: ICI WG Face to Face meeting (Honeywell, Phoenix, AZ)
 - Likely will discuss interim report if there are any open action items
- 28 February – Submit interim report to FAA (Meteorologist contractor requested additional review time)
- April 2023 F2F meeting (Boeing, Washington, DC)
- September 2023 F2F meeting (Boeing, Seattle, WA) OR (Textron, Wichita, KS)
- 4Q2023 F2F meeting (EASA, Cologne, Germany) OR (GE, Munich, Germany)
- **GOAL:** Final report to FAA before end of 2024

STATUS OF TASKING

Task #	Description	Status
1	Evaluate recent ICI environment data obtained from both government and industry to determine whether flight testing data supports the existing Appendix D envelope.	Complete
2	Evaluate the results carried out in Task 1 and recommend changes to the existing Appendix D envelope, as required. Examine how compliance with §33.68(e) and §25.1093(b)(1) can be shown to demonstrate that at the airplane level, engine effects that could prevent the continued safe flight and landing of the airplane during encounters in ice crystal icing conditions would be extremely improbable (10^{-9}). If that cannot be shown, recommend changes to the text of §33.68 or §25.1093 (or a combination of both) that would provide the level of safety described by §25.1309(b)(1).	ALT-SAT Envelope Complete Joint Probability study in work
3	Compare available service data on air data probes from both government and industry probes on Appendix D, including any changes proposed in Task 2. Determine whether engine or aircraft data probe responses warrant the use of a different environmental envelope from those proposed in Task 2, or to the existing Appendix D envelope.	Complete
4	Evaluate the results from Task 3 and recommend ICI boundaries relevant to aircraft and engine air data probes. If the working group proposes a different envelope for aircraft and engine air data probes, recommend if these should be included in the existing Appendix D, or create a new appendix to Part 33.	Complete
5	Identify non-harmonized FAA or EASA ICI regulations or guidance. If the working group finds significant differences that impact safety, propose changes to increase harmonization that may also include icing environments other than Appendix D as a secondary objective.	In Work
6	Recommend changes to the Advisory Circular AC20-147a, Turbojet, Turboprop, Turboshift and Turbofan Engine Induction System Icing and Ice Ingestion, based on Task 1 through 5 results.	In work
7	Assist the FAA in determining the initial qualitative and quantitative costs, and benefits that may result from the working group's recommendations.	TBC
8	Develop a recommendations report containing the results of tasks 1 through 6. The report should document both majority and dissenting positions on the findings, the rationale for each position, and reasons for disagreement.	Interim report on verge of completion

AREAS of ARAC CONSIDERATION

- None